

Stillwater Pasture Renovation Project – Site A, Year 1

Garrett Larson, NRCS District Conservationist, Columbus, MT

2019

County: Stillwater

Average annual precip: 15"

MLRA: 58A, Northern rolling plains

Dominant Soil: Tanna-Rentsac Complex, clay loam

Acres: 142.7

Planting Date: May 15, 2019

Seeding Rate: 483,418 seeds/acre = 11 seeds/ft² = 29 lb/ac

Seed cost: \$31.72/acre (inoculant, and seed)

Seeding Method: John Deere no-till air drill, single disk opener

Row Spacing: 7.5"

Tillage: No-till

Previous Crop and Year: Perennial forage, crested wheatgrass

Herbicides: Glyphosate (24 oz/ac) May 14, 2019 to kill crested wheatgrass

Post-emergence: None

Insecticides/Fungicides: None

Fertilizer: None

Irrigation: Dryland

Termination Date: August 23, 2019

Termination Method: Grazing

Next Crop: Annual cover crop, spring 2020


Fig. 1. Annual cover crop, Aug 5, 2019 with very thin cover. Dried-out plants are field peas that have shelled out.

Table 1. Monthly precipitation at Columbus, MT. Western Regional Climate Center, station #241938.

Columbus	J	F	M	A	M	J	J	A	S	O	N	D	Total
30 yr avg 1989-2019	0.61	0.67	1.08	1.85	2.69	2.27	1.18	0.93	1.31	0.93	0.64	0.57	14.99
2018	0.85	1.51	0.65	2.48	5.82	2.56	1.15	1.25	0.77	0.88	0.69	0.43	19.04
2019	0.59	1.45	0.51	2.83	3.60	2.65	2.88	0.72	5.01	1.87	0.73	0.14	22.98

Introduction:

Multiple pastures in Stillwater County are being converted from crested or intermediate wheatgrass monoculture to a more diverse perennial forage mix. Crested wheatgrass is killed with herbicide in the spring of Year 1. Annual cover crops are grown and grazed for two years to provide forage, allow for adequate kill of the crested wheatgrass, and to provide soil health benefits. Diverse perennial pasture mixes will be seeded in Year 3. This report gives results of Site A after the first year of annual cover crops.

Results:

Site A was sprayed with 24 oz/ac of glyphosate on May 14 to kill crested wheatgrass. This timing and rate provided good kill of the crested. A mixed-species annual cover crop was planted on May 15 with a single disc no-till drill (Table 2). The cover crop was sampled on August 5, 2019 with four hoop clippings and an average air-dried biomass of 1,620 lb/acre, or 0.81 ton/acre. There were 1671 Growing Degree Days (Base 40) from the time of seeding to sampling (May 15-Aug 5). Assuming 910 lbs of forage per animal month, and 50% utilization rate on 142.7 acres, there were 127 AUMs available in this field.

Table 2. Annual cover crop mix seeded at Site A, May 15, 2019.

Cover Crop Species	Seeding Rate (lb/ac)	Percentage of mix
Field Pea	10	4
Soybean	6	6
Pearl Millet	1.5	26
Sorghum-sudangrass	6	21
Spring Barley	3	7
Forage Collards	0.5	18
Turnip	0.25	13
Sunflower	2	5
TOTAL	29.25	100

Summary and Discussion:

2019 was a wet year, with close to 23 inches of total precipitation, or 8 inches more than the 30-yr normal. In retrospect, the sorghum/sudan rate should have been increased as it provided a significant amount of biomass late in the year. The sunflower seeding rate should have been decreased to from 2 lb/ac to 1 lb/ac. Due to high moisture, the soybeans performed well in the mix and maintained their green until the cattle were turned in, which far exceeded expectations in a dryland setting.

Grasshoppers were a major pest in the cover crop, targeting the cool season species of barley, turnips, and forage collards. The infestation was throughout the northern part of Stillwater County and was one of the worst grasshopper years seen in a long time. Interestingly, these grasshoppers targeted one cover crop species at a time, starting with barley, then turnips, and finally the collards. The field peas were not targeted and virtually all reached pod stage and shelled out. The grasshoppers then moved on to the soybeans and sunflowers. Prior to frost, the grasshoppers were eating the centers out of the sunflowers. If grasshoppers had not been an issue, we believe the cover crop yield on this field would have been at least double what the clipping data shows.

Cattle were turned in on August 23, and grazed until right before an anticipated first frost for 2019. Cattle were pulled from the field for 3 weeks to avoid prussic acid poisoning from the sorghum/sudan due to frost and then turned back in.

The producer did not use any fertilizer with this seeding. In hindsight, N and P fertilizer should be used on all future renovation projects. Old crested wheatgrass residue ties up N and prevents nutrient cycling. In addition, most fields are historically low in P due to inadequate fertilization when they were in cropland.



Fig. 2. Crested wheatgrass Site A, prior to chemical application, May 7, 2019 (l). Dark spots on the road are clusters of grasshoppers cannibalizing dead grasshoppers, Aug 5, 2019 (c). Cattle grazing the cover crop, Aug 23, 2019 (r).